

## SECTION V.—SEISMOLOGY.

## THE ALABAMA EARTHQUAKE OF OCTOBER 18, 1916.

By RUY HERBERT FINCH, Assistant.

[Dated: Seismological Investigations, Weather Bureau, Jan. 30, 1917.]

An earthquake occurred on October 18, 1916, a little to the northeast of Birmingham, Ala., that has been reported from eight different States: Alabama, Georgia, Indiana, Kentucky, Mississippi, North Carolina, South Carolina, and Tennessee. Undoubtedly it was felt in Florida also, as Geneva on the Alabama-Florida line reported it with an intensity of II, Rossi-Foré.

The occurrence of this earthquake was unnoticed in many places owing to the high winds and heavy rain incident to a hurricane then passing over the east Gulf States. Several persons, in fact, mistook the earthquake disturbance for wind effects. Thus, the observer at Marshallville, Ga., remarked to his wife, "We are having some wind to-day," to which she replied that there was just one strong gust and that it had died down.

The data used in this note, given in some detail on pages 589-590 in the MONTHLY WEATHER REVIEW for October, 1916, were obtained from some 200 card reports rendered by Weather Bureau cooperative observers, United States postmasters, and others. Thanks are specially due to Mr. W. N. Maddox, of Easonville, Ala., who furnished much valuable information.

The influence of the geologic structure on the propagation of the earthquake waves is shown by the fact that the earthquake was felt 340 miles to the north and to the east, 190 miles to the south, and only 130 miles to the west, where the waves encountered the unconsolidated material of the Mississippi Delta. To the northeast along the continuation of the ridge in which the epicenter is situated, the quake was not felt as far as it was to the north and east. (See fig. 1.) An interesting account of the difference in effects of an earthquake on dry hilly land and moist sandy land was furnished by Hon. R. E. Thompson, of Toomsba, Miss. Mr. Thompson, whose house is located on a damp sandy foundation, felt and could give a good description of the earthquake, while his neighbors whose houses are on higher and drier land did not know that anything unusual had occurred.

Instrumental records of the earthquake were made by the seismographs of the University of Kansas at Lawrence, Kans., Georgetown University, and the Weather Bureau at Washington, D. C.

The highest intensity reported was VII-VIII (Rossi-Foré) at Easonville and Irondale, Ala. The different intensities as reported are shown on the accompanying chart. The isoseismals are, of course, only relatively accurate and are drawn for average values. The inaccuracy of isoseismals based upon a few reports is well illustrated by the fact that Lewisburg, Tenn., reported the quake with an intensity of IV-V, while a small hamlet on a rural free mail delivery route from Lewisburg reported that it was not felt.

The time of the shock as given by a majority of reports was 4:03-4:04 p. m., 90th meridian time. Mr. C. F. von Herrmann, in charge of the Weather Bureau office at Atlanta, Ga., reported two shocks and gave the time

very accurately, reporting the first shock at 4<sup>h</sup> 04<sup>m</sup> 05<sup>s</sup> and the second at 4<sup>h</sup> 05<sup>m</sup> 25<sup>s</sup> p. m. But as Atlanta is about 130 miles from the epicenter it may be that these two shocks were only different phases of the same quake. The average time of the occurrence at the epicenter, as determined from the seismograph records of the University of Kansas, Georgetown University, and the Weather Bureau at Washington by means of the P-O table of Dr. Klotz, is 4<sup>h</sup> 03<sup>m</sup> 14<sup>s</sup> p. m.

As is usual, the main shock of October 18 was followed by several weaker ones. At 10:54 p. m. October 18 a shock was felt over most of the territory bounded by the VII isoseismal. A few people felt shocks at about 9 p. m., October 22, and on the morning of October 28. Birmingham was shaken by a light tremor at 6:15 a. m. November 4, but there is some doubt as to whether this was seismic or due to a mine explosion.

The Geological Survey detailed a trained geologist, Mr. Oliver B. Hopkins, to make a study of the epicenter region, and his interesting report follows.

NOTES RELATING TO THE EARTHQUAKE OF OCTOBER 18, 1916, IN NORTH-CENTRAL ALABAMA.<sup>1</sup>

By OLIVER B. HOPKINS, Associate Geologist.

[Dated: U. S. Geological Survey, Washington, D. C., Jan. 8, 1917.]

*Observations.*

*Time.*—According to Mr. C. J. Yow, train dispatcher of the Southern Railway at Pell City, Ala., the most intense shock occurred at 4:03 p. m. (90th meridian time), October 18, and smaller, but distinct, shocks at 8:53 p. m. and 9:11 p. m. on October 22. Other shocks are reported by a number of people as having occurred at about 11 p. m. October 18 and about 6 a. m. October 28. The first shock at 4:03 p. m. on October 18 is the only one which was sufficiently severe to be generally felt from Birmingham eastward beyond Pell City.

*Duration.*—The duration of the first shock has been variously estimated from less than one-half minute to more than a minute. No close estimate of the actual time during which the movement could be felt can be given because few people realized that any disturbance was taking place until it had reached its maximum intensity. An observer near Easonville was certain from his action during the shock that it could be distinctly felt for more than a minute; on the other hand another observer at Irondale stated that it could be felt probably less than one-half minute, since he rushed out of doors as soon as he was conscious of the shaking and when he got outside the shaking had ceased.

The subsequent shocks were less severe and were experienced by few people.

*Direction of vibration.*—The examination of a number of fallen objects, principally chimneys, near Easonville, Pell City, and Irondale, suggests that the direction of

<sup>1</sup> Published by permission of the Director of the U. S. Geological Survey, as conveyed in his letter of Jan. 8, 1917.